

BAUGHMAN & GUTEAU.

Blast Furnace.

No. 646.

Patented Mar. 21, 1838.

Fig. 2.

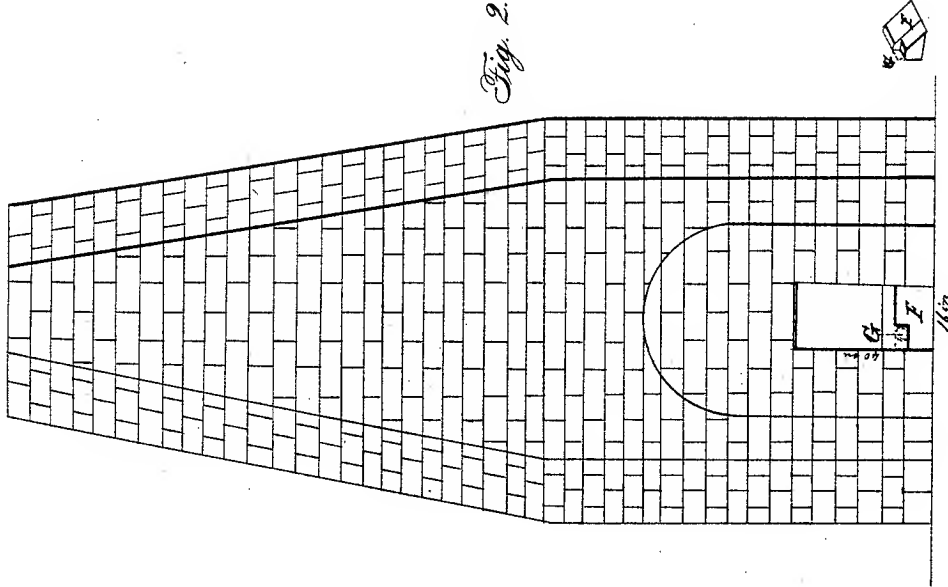
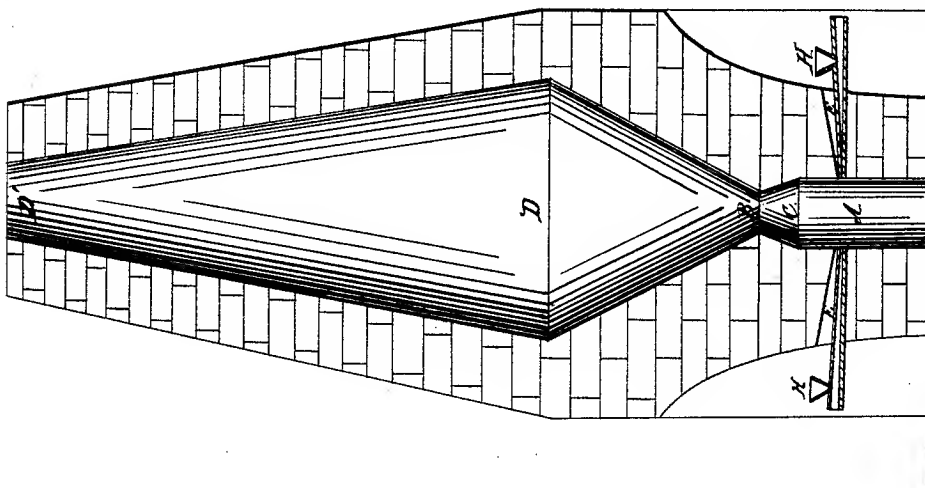


Fig. 1.



UNITED STATES PATENT OFFICE.

JOSEPH BAUGHMAN, OF HERFORD TOWNSHIP, BERKS COUNTY, AND JULIUS GUTEAU, OF MAUCH CHUNK, PENNSYLVANIA.

IMPROVEMENT IN FURNACES FOR SMELTING IRON WITH ANTHRACITE.

Specification forming part of Letters Patent No. 646, dated March 21, 1838.

To all whom it may concern:

Be it known that we, JOSEPH BAUGHMAN, of Herford township, in the county of Berks, and JULIUS GUTEAU, of Mauch Chunk, in the county of Northampton, in the State of Pennsylvania, have invented a new and Improved Mode of Constructing Furnaces for and of Smelting Iron Ore by Means of Anthracite Coal as Fuel; and we do hereby declare that the following is a full, clear, and exact description thereof.

The dimensions of the respective parts of our furnace which we are about to give are such as will designate one of moderate size, our object being to afford a clear view of the general construction and arrangement thereof without intending thereby to limit ourselves to the precise admeasurement set down. They will, however, exhibit a general character by which any competent ironmaster will be enabled to see the difference between our furnace and all those which have preceded it, and also to construct the same. The whole height of a furnace which we have essayed and found to answer well is twenty-four feet and four inches, the height above the hearth being twenty feet, leaving, of course, four feet four inches for the whole height of the hearth.

In the accompanying drawings, Figure 1, (which is a vertical section of the furnace,) A is the hearth, measuring from the bottom to the top at B fifty-two inches, of which the measurement from the bottom to C is forty inches, and from C to B one foot. The hearth at bottom is sixteen inches wide and fifty-two inches long. The part C is eighteen inches diameter, and B fourteen inches, this being the upper part of the hearth and bottom of the boshes. The part extending from C to B is round at B, where it joins the boshes; but at C, where it measures eighteen inches and joins the hearth proper, it is worked off to a square corresponding to the shape of the hearth. The height of the boshes from B to D is six feet, the diameter at D being four feet six inches, giving to the boshes an inclination from the perpendicular of three inches and a half to the foot. The slope of this part is a point of considerable importance, as it in a great degree regulates the pressure of the charge, and adapts the furnace to the particular kind of

fuel employed. The body of the furnace from D to D' is twenty feet, and its diameter at D' two feet. E E represent the tuyeres for the blast, one, two, or three of which may be used. In our experiments we have found but one necessary, which we have found to answer perfectly well with a cold blast, (although the hot blast was tried,) at a pressure of two and one-half pounds to the inch. A water-tuyere is in all cases to be preferred. The general construction and arrangement of the furnace thus far, it will be seen, do not present anything peculiar. Our manner of constructing and arranging the dam-stone, however, we deem to be new, without which, or some means whereby fluid iron is constantly kept on the hearth, a furnace cannot be kept in continuous action with anthracite coal as a fuel.

Fig. 2 shows the front of the hearth, exhibiting the dam-stone and false dam-stone as arranged and used by us. This front is forty inches in height and eighteen inches wide at the top and sixteen at the bottom. The dam-stone F is twelve inches long and twelve inches high, and it is about the same in depth from front to inside. G is what we denominate the "false dam-stone." This is four inches in width and four in height, filling up the space in the width not occupied by the dam-stone. This of course is raised to the height of the dam-stone in the usual manner by clay and sand, into which the tapping-holes are to be made. The blast is to be introduced at the height of sixteen inches from the bottom of the hearth, and four inches, of course, above the dam-stone. In the blast-pipes H H are funnels placed about three feet from their small ends, which funnels may, in case of the deadening of the fire at any time in the cold blast, be charged with charcoal or other fuel, which will be blown in and obviate this difficulty, as is known to the managers of furnaces.

In working our furnace it is requisite always to retain a quantity of fluid metal in the lower part of the hearth—say to a height from four to six inches—which is effected by means of the false dam-stone and the management of the tapping-hole. When it is desired to remove the metal below the top of the false dam-stone it may be dipped out as in the usual way. To enable us to remove most of the fluid iron

and still keep the scoria floating upon the metal, we sometimes throw in several pounds of lead, which melts and sinks below the iron, which it keeps from contact with the bottom of the hearth, while it is itself protected from the action of the atmosphere by the iron above it.

We first charge our furnaces with charcoal, preparing and managing the ore, the flux, and the fuel in carrying on the process in the ordinary manner, not requiring to be particularly described, as varying with the nature of the materials, as things well known to every ironmaster. Another peculiarity in our furnace is the location and use of the flue or throat extending from the top of the hearth C to the bottom of the boshes B, as described, we having found this part of essential service in regulating the heat, the descent of the load, and consequently the quality of the iron.

What we claim as our invention, and wish to secure by Letters Patent, is—

1. The manner in which we arrange and em-

ploy the dam-stone and false dam-stone, substantially as by us set forth.

2. The inverted conical flue or throat, as described, between the top of the hearth proper and the boshes.

3. The employment of lead, in the manner and for the purposes herein shown.

We wish it to be further understood that we intend to use a furnace of the kind described—that is to say, one with the dam-stone, the false dam-stone, and the flue or throat—for the purpose of smelting iron with coke of bituminous coal, employing also the same precautions in the use of lead and in all other points as we employ when anthracite is the fuel, so far as the same may be found necessary or useful in their application.

JOSEPH BAUGHMAN.
JULIUS GUTEAU.

Witnesses:

JACOB H. BOYER,
HENRY GROFF.